

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

- 1           1. (Currently amended) A method for verifying whether a trace can be  
2     produced by a generator, comprising:  
3           receiving a specification for the generator, wherein the generator is a finite  
4     state machine that defines a set of inputs and outputs, and wherein the generator  
5     ~~contains~~ ~~may contain~~ parametric inputs to model non-determinism;  
6           receiving the trace, wherein the trace is a sequence of assignments of non-  
7     parametric inputs and outputs for the generator, and wherein the trace does not  
8     contain assignments of parametric inputs;  
9           using the specification to build a data structure that can be used to  
10    determine if a non-parametric input and output are consistent with the current  
11    state of the generator; ~~and~~  
12           verifying elements of the trace, wherein verifying a given element involves  
13    using the data structure to determine if there exists any parametric input  
14    assignment that causes a match between non-parametric inputs and outputs of the  
15    generator with the ones specified in the given element of the trace; and  
16           if the specification of the generator is sequentially deterministic, and hence  
17    does not depend on parametric inputs, translating the generator into a checker and  
18    using that checker to verify the trace.

- 1           2. (Original) The method of claim 1,

2           wherein the generator is sequentially deterministic, which means that there  
3 exists a single next state for each combination of current state, non-parametric  
4 input, and output; and  
5           wherein using the data structure to determine if there exists any parametric  
6 input assignment involves,  
7                   using the data structure to perform a satisfiability test to  
8                   determine if there exist any parametric inputs that can match the  
9                   non-parametric input and output assignment of the generator with  
10                  the ones of the trace at a current state, and  
11                  computing a unique next state based on the current state,  
12                  the non-parametric input and the output.

1           3. (Original) The method of claim 1,  
2           wherein the generator is sequentially non-deterministic, which means that  
3 the next state can depend on a parametric input, and consequently there can exist  
4 more than one next state for some combinations of current state, non-parametric  
5 input, and output; and  
6           wherein using the data structure to determine if there exists any  
7 parametric input assignment involves determining a set of next states;  
8           wherein determining the set of next states involves considering all possible  
9 parametric inputs, all states in a current set of states, the non-parametric input and  
10 the output;  
11           wherein if there exists at least one state in the set of next states, the non-  
12 parametric input and output are consistent with the generator.

1           4. (Original) The method of claim 3, wherein determining the set of next  
2 states involves computing a forward image and constraining the parametric input  
3 and output to their assignments in the trace.

1           5. (Original) The method of claim 1, wherein the trace is produced by a  
2 simulation of a system under test.

1           6. (Original) The method of claim 1, wherein the data structure is in the  
2 form of a binary decision diagram (BDD).

1           7. (Original) The method of claim 1, wherein if for all possible parametric  
2 inputs the non-parametric input and output are not consistent with a generator  
3 output, the trace is not valid.

1           8 (Canceled).

1           9. (Currently amended) A computer-readable storage medium storing  
2 instructions that when executed by a computer cause the computer to perform  
3 method for verifying whether a trace can be produced by a generator, comprising:  
4           receiving a specification for the generator, wherein the generator is a finite  
5 state machine that defines a set of inputs and outputs, and wherein the generator  
6 contains ~~may contain~~ parametric inputs to model non-determinism;  
7           receiving the trace, wherein the trace is a sequence of assignments of non-  
8 parametric inputs and outputs for the generator, and wherein the trace does not  
9 contain assignments of parametric inputs;  
10          using the specification to build a data structure that can be used to  
11 determine if a non-parametric input and output are consistent with a parametric  
12 input and output for the generator; ~~and~~  
13          verifying elements of the trace, wherein verifying a given element involves  
14 using the data structure to determine if there exists any parametric input  
15 assignment that causes a match between non-parametric inputs and outputs of the  
16 generator with the ones specified in the given element of the trace; and

17        if the specification of the generator is sequentially deterministic, and hence  
18        does not depend on parametric inputs, translating the generator into a checker and  
19        using that checker to verify the trace.

1            10. (Original) The computer-readable storage medium of claim 9,  
2            wherein the generator is sequentially deterministic, which means that there  
3            exists a single next state for each combination of current state, non-parametric  
4            input, and output; and  
5            wherein using the data structure to determine if there exists any parametric  
6            input assignment involves,  
7                        using the data structure to perform a satisfiability test to  
8                        determine if there exist any parametric inputs that can match the  
9                        non-parametric input and output assignment of the generator with  
10                      the ones of the trace at a current state, and  
11                      computing a unique next state based on the current state,  
12                      the non-parametric input and the output.

1            11. (Original) The computer-readable storage medium of claim 9,  
2            wherein the generator is sequentially non-deterministic, which means that  
3            the next state can depend on a parametric input, and consequently there can exist  
4            more than one next state for some combinations of current state, non-parametric  
5            input, and output; and  
6            wherein using the data structure to determine if there exists any  
7            parametric input assignment involves determining a set of next states of a  
8            generator;  
9            wherein determining the set of next states involves considering all possible  
10           parametric inputs, all states in a current set of states, the non-parametric input and  
11           the output;

12            wherein if there exists at least one state in the set of next states, the non-  
13 parametric input and output are consistent with the generator.

1            12. (Original) The computer-readable storage medium of claim 11,  
2 wherein determining the set of next states involves computing a forward image  
3 and constraining the parametric input and output to their assignments in the trace.

1            13. (Original) The computer-readable storage medium of claim 9, wherein  
2 the trace is produced by a simulation of a system under test.

1            14. (Original) The computer-readable storage medium of claim 9, wherein  
2 the data structure is in the form of a binary decision diagram (BDD).

1            15. (Original) The computer-readable storage medium of claim 9, wherein  
2 if for all possible parametric inputs the non-parametric input and output are not  
3 consistent with a generator output, the trace is not valid.

1            16 (Canceled).

1            17. (Currently amended) An apparatus that verifies whether a trace can be  
2 produced by a generator, comprising:

3            a receiving mechanism configured to receive a specification for the  
4 generator, wherein the generator is a finite state machine that defines a set of  
5 inputs and outputs, and wherein the generator contains ~~may contain~~ parametric  
6 inputs to model non-determinism;

7            wherein the receiving mechanism is additionally configured to receive the  
8 trace, wherein the trace is a sequence of assignments of non-parametric inputs and

9 outputs for the generator, and wherein the trace does not contain assignments of  
10 parametric inputs;  
11 a data structure building mechanism configured to use the specification to  
12 build a data structure that can be used to determine if a non-parametric input and  
13 output are consistent with a parametric input and output for the generator; and  
14 a verification mechanism configured to verify elements of the trace,  
15 wherein verifying a given element involves using the data structure to determine if  
16 there exists any parametric input assignment that causes a match between non-  
17 parametric inputs and outputs of the generator with the ones specified in the given  
18 element of the trace; and  
19 a translation mechanism configured to translate the generator into a  
20 checker and use that checker to verify the trace if the specification of the generator  
21 is sequentially deterministic, and hence does not depend on parametric inputs.

1 18. (Original) The apparatus of claim 17,  
2 wherein the generator is sequentially deterministic, which means that there  
3 exists a single next state for each combination of current state, non-parametric  
4 input, and output; and  
5 wherein while using the data structure to determine if there exists any  
6 parametric input assignment, the verification mechanism is configured to,  
7 use the data structure to perform a satisfiability test to  
8 determine if there exist any parametric inputs that can match the  
9 non-parametric input and output assignment of the generator with  
10 the ones of the trace at a current state, and to  
11 compute a unique next state based on the current state, the  
12 non-parametric input and the output.

1 19. (Original) The apparatus of claim 17,

2           wherein the generator is sequentially non-deterministic, which means that  
3           the next state can depend on a parametric input, and consequently there can exist  
4           more than one next state for some combinations of current state, non-parametric  
5           input, and output; and

6           wherein while using the data structure to determine if there exists any  
7           parametric input assignment, the verification mechanism is configured to  
8           determine a set of next states of a generator;

9           wherein determining the set of next states involves considering all possible  
10          parametric inputs, all states in a current set of states, the non-parametric input and  
11          the output;

12          wherein if there exists at least one state in the set of next states, the non-  
13          parametric input and output are consistent with the generator.

1           20. (Original) The apparatus of claim 19, wherein while determining the  
2           set of next states the verification mechanism is configured to compute a forward  
3           image and constraining the parametric input and output to their assignments in the  
4           trace.

1           21. (Original) The apparatus of claim 17, wherein the trace is produced by  
2           a simulation of a system under test.

1           22. (Original) The apparatus of claim 17, wherein the data structure is in  
2           the form of a binary decision diagram (BDD).

1           23. (Original) The apparatus of claim 17, wherein if for all possible  
2           parametric inputs the non-parametric input and output are not consistent with a  
3           generator output, the trace is not valid.

1           24 (Canceled).

1           25. (Currently amended) A means for verifying whether a trace can be  
2 produced by a generator, comprising:  
3           a receiving means for receiving a specification for the generator, wherein  
4 the generator is a finite state machine that defines a set of inputs and outputs, and  
5 wherein the generator contains ~~may contain~~ parametric inputs to model non-  
6 determinism;  
7           wherein the receiving means is additionally configured to receive the trace,  
8 wherein the trace is a sequence of assignments of non-parametric inputs and  
9 outputs for the generator, and wherein the trace does not contain assignments of  
10 parametric inputs;  
11           a data structure building means configured to use the specification to build  
12 a data structure that can be used to determine if a non-parametric input and output  
13 are consistent with a parametric input and output for the generator; and  
14           a verification means configured to verify elements of the trace, wherein  
15 verifying a given element involves using the data structure to determine if there  
16 exists any parametric input assignment that causes a match between non-  
17 parametric inputs and outputs of the generator with the ones specified in the given  
18 element of the trace; and  
19           a translation means configured to translate the generator into a checker and  
20 use that checker to verify the trace if the specification of the generator is  
21 sequentially deterministic, and hence does not depend on parametric inputs.